

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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Applicant's or agent's file reference 247	FOR FURTHER ACTION		See Form PCT/PEA416
International application No. PCT/EP2004/009685	International filing date (day/month/year) 30.08.2004	Priority date (day/month/year) 29.09.2003	
International Patent Classification (IPC) or national classification and IPC C22B19/04, C22B5/16, C22B9/22, C22B4/08, C22B13/02			
Applicant UMICORE et al.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 3 sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 12.04.2005		Date of completion of this report 12.01.2006	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized Officer Bjoerk, P Telephone No. +49 89 2399-8452	



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2004/009685

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-3, 5-8 as originally filed
4 filed with telefax on 17.08.2005

Claims, Numbers

1-11 filed with telefax on 17.08.2005

Drawings, Sheets

1/1 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2004/009685

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	1-11
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/EP2004/009685

1. The application relates to a process for recovering metal values from a Zn-, Fe- and Pb-bearing residue whereby the residue is subjected to a flash or agitated bath fuming step, Zn- and Pb-bearing fumes are extracted to valorise Zn and Pb and either one or more of CaO, SiO₂ and MgO are added as a flux in order to obtain a final slag composition as defined through the three inequalities of claim 1. A single-chamber smelting and fuming reactor comprising a plasma fired tuyere attached to a plasma torch is also claimed in claim 10.

Through the combination of forced agitation and the claimed slag composition, a rapid fuming process with improved yield and which can be run continuously can be achieved. It is said to be particularly suited for treating neutral leach residue or weak acid leach residue (p.3, l.17-25).

2. Claim 10 has been amended by specifying that the plasma tuyere is a "plasma fired tuyere attached to a plasma torch".

The amendment finds a basis on page 5, line 29 ("equipped with submerged plasma fired tuyeres") and on page 6, lines 27-28 ("tuyere attached to a 1 MW air plasma torch") and is therefore allowable with regard to Art.19(2) PCT.

3. Reference is made to the following documents:

D1: US-A-4 415 356

D2: US-A-4 521 245

D3: US-A-4 519 836

D4: US-A-4 571 260

D5: US-A-5 942 023

D1 relates to an autogenous smelting process of sulfide material containing Cu, Ni, Co, Pb, Zn etc. (col.1, l.8-22). The autogenous smelting is preferably done by oxygen flash smelting (claim 2).

D2 relates to flash smelting processing of sulphide Cu or Cu-Zn concentrates where

a highly basic molten slag with a maximum of 18 wt% SiO_2 is obtained (abstract).

D3 relates to flash smelting processing of Pb sulfide or Pb-Zn sulfide ores or concentrates where a molten slag with the following compositional requirements is obtained: $(\text{SiO}_2 + \text{Al}_2\text{O}_3)/\text{FeO} = (0.67-1.22)/1$ and $(\text{CaO} + \text{MgO})/\text{FeO} = (0.22-0.75)/1$ (abstract).

D4 relates to a smelting process for recovering metal values from materials containing Sn and/or Zn whereby the slag is vigorously agitated by mechanical, pneumatic or electrical means, preferably by rotating the furnace (col.4, l.30-37). D4 also suggests a slag composition of 20-30% SiO_2 , 25-35% CaO, <25% FeO and 5-10 $\text{MgO} + \text{Al}_2\text{O}_3$ (col.4, l.5-21).

D5 relates to a process for recovering metals from electric arc furnace (EAF) dust, using a reactor with a plasma tuyere as heat and gas sources, whereby the plasma is generated (18) below the slag level (30). Hazardous heavy metals are volatilized (32) (abstract and figure).

4. Process claims 1-9

Documents D1 to D4 show processes using a flash or agitated bath fuming step together with the extraction of Zn- and Pb-bearing fumes. However, none features slag compositions which fulfill the requirements set up in claim 1. Whereas D4 does discuss the fact that the skilled person would select a suitable slag from case to case (col.4, l.5-21), there is no hint in the available prior art to aim at a slag composition as presently claimed.

Consequently, the subject matter of claims 1 to 9 is seen to fulfill the requirements of Art.33(2) and (3) PCT.

5. Apparatus claims 10-11

Document D5 does not as such show a submerged tuyere attached to a plasma torch but merely the formation of a plasma arc zone 18 between the cathode formed by the

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/EP2004/009685

terminal end of the hollow graphite electrode 20 and the anode formed by the conductive plate 14. The "plasma gas" injected at 28 is inert gas which serves to cool the graphite electrode (col.3, l.19-39).

The arrangement of claim 10 is also not suggested in any of the remaining prior art.

Consequently, the subject matter of claims 10 and 11 is also seen to fulfill the requirements of Art.33(2) and (3) PCT.